

**REMARKS**

This is in response to the Office Action dated March 21, 2005, in which Claims 19-22 were withdrawn from consideration by the Examiner, Claims 1-14 and 23-24 were rejected, and Claims 15-18 were allowed. Claims 1, 9-10, 12-14 and 23 have been amended as above, and Claim 11 has been canceled without disclaimer or prejudice. It is respectfully submitted that, as amended, all the pending claims are allowable.

***Drawings***

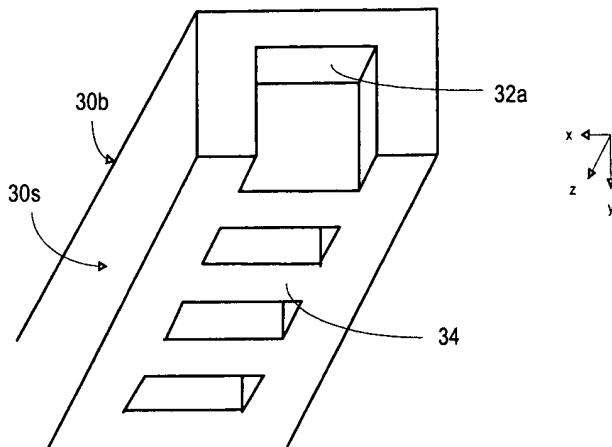
Figure 3 has been amended to overcome the objection.

***Specification***

The Examiner objected specification and indicated that in paragraph [0022], it is unclear as to how the applicant is defining “ridge” and “trench”. The Examiner suggested that ridge “32” should be changed to --34-- and trenches (i.e. hollow portion) “34” should be changed to --32-- (see fig. 4).

The Applicant respectfully traverses the objection because definitions of the ridge 32 and the trench 34 are relative terms depending on the viewing direction and the reference point/object. For example, when one observes the slow-wave structure 10 in a reversed direction as shown in the following drawing, the ridge and trench behaviors of 32 and 34 can be easily seen.

Alternatively, although the structure 32 is recessed from the top wall 30t as described in paragraph [0022] of page 5, while observing the waveguide 10 from the interior side thereof, the structure 32 also appears to be a ridge protruding into the rectangular profile defined by the conductive top wall 30t, sidewalls 30s, and bottom wall 30b. In other words, to a wave that propagates through the channel defined by the waveguide 10, the structures 32 appears to be a ridge which changes the rectangular propagation path as shown in Figure 6 into a path as shown in Figure 5. The structures 34 recessed from the ridgeline of the structure 32 behave like trenches relative to the ridge 32.



***Claim Rejection – 35 USC § 102***

Claims 1-3, 5-10, 12-14, 23 and 24 were rejected under 35 U.S.C. 102(e) as being anticipated by Mack et al. (US Patent No. 6,476,696) and under 35 U.S.C. 102(b) as being anticipated by Brill (US Patent No. 2,943,280) and Levy (US Patent No. 3,597,710).

***Claim 1-8***

Claim 1 includes a ridge waveguide filter having a slow-wave structure. The slow-wave structure comprises an elongate hollow tube define by conductive sidewall, and **at least one ridge** protruding from a first part of the conductive sidewall into the hollow tube and **extending along an elongate direction of the hollow tube**, wherein the ridge is partitioned by a plurality of trenches into a plurality of ridge segments.

It is well known in the art that a ridge is a narrow strip or line extending from an object or a surface (Referring to “Webster’s New World College Dictionary”). Therefore, as the ridge as claimed in Claim 1 extends along the elongate direction of the hollow tube, when a wave propagates along the elongate direction of the hollow tube, a propagation path is converted from a rectangular profile (Fig. 6) into a ridged rectangular profile (Fig. 5 as originally submitted) as:

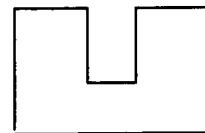
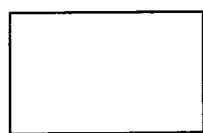


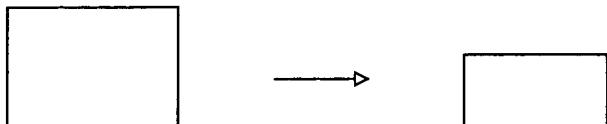
Fig. 6

Fig. 5

The trenches partitioning the ridge break the ridge into a plurality segments; and consequently, provides a propagation path having the rectangular profile (Figure 6) and the ridged rectangular profile (Figure 5) alternately. The alternate propagation profile introduced in the waveguide do not only lower the cutoff frequency of the wave propagating through, but also avoids decrease of the characteristic impedance.

Mack et al. discloses "*Referring to FIG. 3, a section 101 of a waveguide housing, according to an embodiment of the present invention, comprises an elongate channel section having first, second and third walls 103, 105, 107 defining a waveguide channel 109. A plurality of projections 111 are provided along the second wall 105 within the waveguide channel 109. In this embodiment, the projections 111 are rib-like structures which extend substantially perpendicular to the length of the waveguide channel, and between the opposed first and third walls 103 and 107. Also, in this embodiment, the rib structures 111 are generally rectangular when viewed along the length of the waveguide channel.*" (Col. 5, lines 26-39). As each of the projections 111 extend substantially perpendicular to the length of the waveguide channel, Mack et al. teaches away "**the ridge extending along an elongate direction of the hollow tube as claimed in Claim 1.**"

As the projections 111 extend perpendicular to the length waveguide channel, the projections 111 do not appear to be "ridge" along the elongate direction of the waveguide because they are in the form of planes instead of "narrow lines or strips" along the direction. As shown in FIG. 3, the projections 111 in the form of planes disclosed by Mack et al. actually extend side-to-side (from 103 to 107) across the waveguide 101. As understood, the side-to-side projections provide nothing more than a rectangular propagation path with a height smaller than that defined by the sidewalls (103, 105, 107 and an unspecified side opposite to 105). That is, when a wave propagates along an elongate direction of the waveguide 101, (that is, through the waveguide channel 109), the propagation path is in the form of rectangles with alternate heights as shown in the following drawing:



As disclosed by Mack et al. (col. 2, line 40 to col. 4, line 47), by limiting the distance between adjacent projections 111, the spaces between adjacent projections 111 function as cavities to resonate the desirable frequency and minimize the unwanted frequency. Mack et al. does not teach or suggest the cutoff frequency. It is well understood that the cutoff frequency cannot be lowered by simply reducing the height of the rectangular propagation profile and limiting the space between adjacent projections 111.

Brill discloses a wave filter that has sections 11, 13, 15 and 17 elevating from the upper and lower blocks 3 and 4 of the waveguide. As clearly shown in the drawing, each the sections 11, 13, 15 and 17 extends **perpendicular to the elongate direction (8) of the waveguide**. Therefore, Brill also teaches away “a ridge extending along an elongate direction of the hollow tube”.

Further, as clearly shown in the drawing, the sections 11, 13, 15 and 17 actually extend from one side (6) to the side (7) opposing thereto. The side-to-side projections 11, 13, 15 and 17 reduce the height of the rectangular propagation path defined by the sidewalls (3, 4, 6, 7). Therefore, similar to Mack et al., when a wave propagates along an elongate direction 8, the propagation path is in the form of rectangles with alternate heights, which, as understood, do not provide the effect of lowering the cutoff frequency of the wave.

Similar to Mack et al. and Brill, Levy discloses a waveguide filter having a plurality of capacitive irises C1-C7 extending perpendicular to the elongate direction of the waveguide (FIG. 6A and FIG. 9A). Therefore, Brill teaches away “a ridge extending along an elongate direction of the hollow tube” as claimed in Claim 1. Further, as shown in FIG. 9A, it appears that the capacitive irises C1-C7 extend from one side to the other across the waveguide. Therefore, similar to both Mack et al. and Brill, when a wave propagates along the elongate direction, of the waveguide, the capacitive irises C1-C7 and the spaces between the irises actually provide rectangular propagation paths with various heights. That is, the capacitive irises do not provide a ridged propagation path intermittently arranged along a rectangular propagation path, which is a result of a ridge extending along the elongate direction as claimed in Claim 1. Therefore, the structure disclosed by Levy cannot achieve the effect of lowering the cutoff frequency as provided by the structure as claimed in Claim 1.

As Mack et al., Brill and Levy all teach away “a ridge extending along an elongate direction of the hollow tube, the rejection over Claims 1 and its dependent Claims 2-8 under 102 is respectfully traversed.

In addition, as the projections disclosed by Mack et al., Brill, Levy all extend from one sidewall to the other sidewall opposite thereto, the propagation path remains as rectangles even though the height thereof are intermittently reduced. As understood, the rectangular propagation path with intermittently reduced height does not provide the effect of lowering the cutoff frequency as that provided by the ridge extending along an elongate direction of the hollow tube as claimed in Claim 1 of the current application. As Mack et al., Brill and Levy does not discuss the cutoff frequency, there shows no desirability of having ridge extending along the elongate direction of the hollow tube as claimed in Clam 1.

Claims 9-14

In the amended Claim 9, a ridge waveguide filter has an elongate hollow tube defined by a conductive top wall, a pair of conductive sidewalls, and a conductive bottom wall and at least one series of ridge segments protruding from the conductive top wall into the hollow tube and extending along an elongate direction of the hollow tube. Each of the ridge segments has two opposing side surfaces **parallel to and separated from** the conductive sidewalls of the hollow tube.

As claimed, the side surfaces of the ridge segments that are parallel to the conductive sidewalls of the waveguide are also separated from the conductive sidewalls too. Therefore, when a wave propagates from the space between adjacent ridge segments to the regions having the ridge segments, the propagation path converts from a rectangular profile as shown in Figure 6 to a ridged rectangular profile as shown in Figure 5. As discussed above, the ridge segments that convert the rectangular propagation profile into a ridged rectangular propagation profile waveguide renders a lower cutoff frequency, while the intermittent introduction of such ridge segments allows the characteristic impedance of the waveguide to be well maintained.

As discussed above, the ridge segments disclosed in Mack et al., Brill and Levy all extend from one sidewall to the other sidewall opposing thereto. That is, the side surfaces of

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the projections disclosed by Mack et al. (111), Brill (11, 13, 15, 17) and Levy (C1-C7) are not separated from the sidewalls of the waveguide. Failing to teach the side surfaces separated from the sidewall of the waveguide, the propagation path provided by the waveguide disclosed by Mack et al., Brill and Levy is in the form of rectangles with intermittently reduced height. This cannot lower the cutoff frequency for the wave propagating through the waveguide.

As Mack et al., Brill and Levy, individually or in combination, fails to teach every element as claimed, the rejection over Claims 9-14 is respectfully traversed. In addition, as none of Mack et al., Brill and Levy suggests the desirability of lowering the cutoff frequency, there is no motivation or suggestion for modifying the “side-to-side” projections into ridge segments having side surfaces parallel to and separated from the conductive sidewalls of the waveguide.

#### Claims 23-24

Regarding Claim 23, Mack et al., Brill and Levy all teach projections extending **perpendicular to the length of the waveguide**. Therefore, Mack et al., Brill and Levy teach away “processing a top wall portion of the waveguide to form a **ridge extending** into the waveguide **along an elongate direction of the waveguide**”.

Therefore, the rejection over Claims 23 and 24 are respectfully traversed.

#### ***Claim Rejection – 35 U.S.C. § 103***

Claims 4 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Mack et al., Levy, or Brill.

The Examiner indicated that providing a circular cross-section sidewall is considered as an obvious design modification to obtain a desire filter characteristics, and it requires only a routine skill in the art.

Claim 11 has been cancelled without prejudice or disclaimer. With regard to Claim 4, the rejection is respectfully traversed because there is no motivation or suggestion for modifying the rectangular waveguide disclosed by Mack et al., Brill and Levy into cylindrical waveguide.

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In view of the foregoing, the application is believed to be in condition for allowance. Entry of the amendments and issuance of a Notice of Allowance is therefore respectfully requested. Should the Examiner have any suggestions for expediting allowance of the application, please contact applicant's representative at the telephone number listed below.

If any additional fee is required, please charge Deposit Account Number 19-4330.

Respectfully submitted,

Date: May 17, 2005 By:

Customer No.: 007663

  
Bruce B. Brunda  
Registration No. 28,497  
STETINA BRUNDA GARRED & BRUCKER  
75 Enterprise, Suite 250  
Aliso Viejo, California 92656  
Telephone: (949) 855-1246  
Fax: (949) 855-6371

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**Amendments to the Drawings:**

In Figure 3, numeral references 10 and 32a have been added to indicate the slow-wave structure of the ridge waveguide and the ridge segments, respectively. In addition, the cutting lines 4-4, 5-5 and 6-6 along which the cross sectional views are taken as shown in Figures 4, 5 and 6 are added.

In Figure 4, the reference numeral “30s” has been deleted.

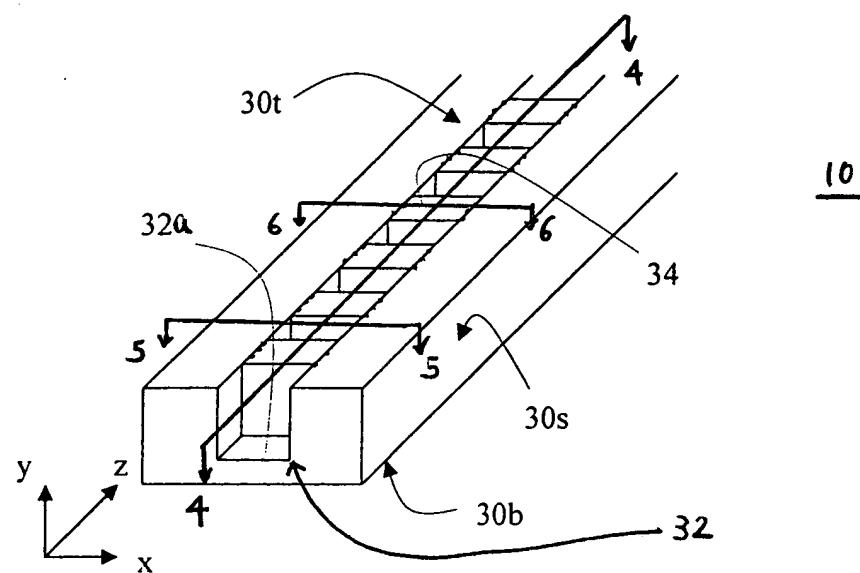


Fig. 3

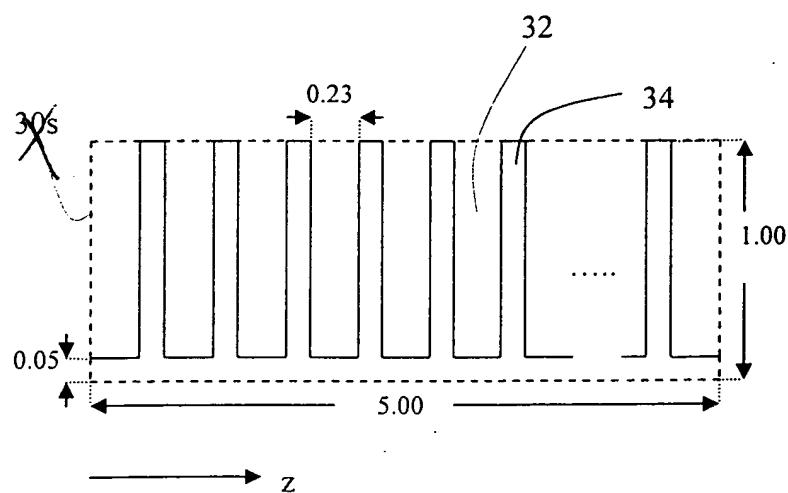


Fig. 4